Complete Revascularization in Older Patients with Myocardial Infarction

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Older patients with acute myocardial infarction are a rapidly growing population that presents unique treatment challenges for the clinician. Such patients usually have more coexisting illnesses and are more likely to have frailty issues than their younger counterparts. They also present more often with high-risk features such as heart failure and shock, along with multivessel and complex coronary artery disease, and they may have more complications from invasive treatment.

Despite these factors, early reperfusion of the culprit vessel with primary percutaneous coronary intervention (PCI) in patients with ST-segment elevation myocardial infarction (STEMI) and an early invasive strategy in patients with non-STEMI (NSTEMI) improves cardiovascular outcomes, regardless of chronologic age. Approximately half of older patients with myocardial infarction also have multivessel coronary artery disease, and several randomized trials have shown that additional PCI of these nonculprit lesions with the goal of complete revascularization is superior to PCI of only the culprit lesion.

The largest of these trials was the 4041-patient COMPLETE trial, which showed that angiography-guided, staged complete revascularization led to a reduction in the risk of cardiovascular death or new myocardial infarction (a composite end point) and to improvements in quality of life. The mean age of the patients in the COMPLETE trial was relatively young at 62 years, and consistent benefits were observed in both younger and older patients. However, data from dedicated trials evaluating the efficacy and safety of complete revascularization specifically in older patients are lacking.

Biscaglia et al. now present in the Journal the primary results of the randomized Functional Assessment in Elderly MI Patients with Multivessel Disease (FIRE) trial, which evaluated complete revascularization as compared with culprit-lesion-only PCI in 1445 older patients (≥75 years of age) with acute myocardial infarction. The median age of the patients was 80 years, and approximately two thirds presented with NSTEMI rather than STEMI. At the 1-year follow-up, complete revascularization resulted in a risk of the primary composite outcome consisting of death, myocardial infarction, stroke, or any revascularization that was lower than the risk in patients who received culprit-lesion-only revascularization (15.7% versus 21.0%; hazard ratio, 0.73; 95% confidence interval [CI], 0.57 to 0.93; P = 0.01). Also lower was the risk of cardiovascular death or new myocardial infarction, stroke, or any revascularization that was lower than the risk in patients who received culprit-lesion-only revascularization (15.7% versus 21.0%; hazard ratio, 0.73; 95% confidence interval [CI], 0.57 to 0.93; P = 0.01). Also lower was the risk of cardiovascular death or new myocardial infarction, another composite end point (8.9% vs. 13.5%; hazard ratio, 0.64; 95% CI, 0.47 to 0.88). Mortality was also lower in the complete revascularization group (9.2% vs. 12.8%; hazard ratio, 0.70; 95% CI, 0.51 to 0.96), and the investigators found no apparent safety concerns with the complete revascularization approach.

First and foremost, the FIRE trial confirms the benefit of complete revascularization that has been observed in previous trials and provides additional evidence for this approach in older patients. The overall frequency of major cardiovascular events in the two groups in this trial was much higher than those in previous trials, which provided greater statistical power to observe moderate treatment effects at the relatively short-term follow-up of 1 year. The reduction in mortality with complete revascularization at 1 year is par-
particularly notable and reinforces the finding that complete revascularization should be considered in all patients presenting with acute myocardial infarction, regardless of age. Second, in contrast to previous trials that enrolled mainly patients with STEMI, most of the patients in the FIRE trial presented with NSTEMI. Although there are important differences in the initial triage and treatment of patients who present with STEMI as compared with NSTEMI, the data from this trial suggest that older patients benefited to a similar extent from complete revascularization regardless of the presence or absence of ST-segment elevation. This finding suggests that the underlying mechanism of recurrent events in the two conditions is likely to be more similar than different. Third, uncertainty remains as to whether to perform complete revascularization with a physiology-guided strategy, in which only functionally significant lesions are revascularized, or with an angiography-guided strategy, in which revascularization is based on stenosis severity.9,10 The former has the advantage of reducing unnecessary PCI of nonculprit lesions by about half but carries the risk of leaving behind nonculprit lesions containing high-risk vulnerable plaque, which has been associated with future ischemic events.

Intracoronary imaging may have an important role in identifying patients with these high-risk lesions who may be more likely to benefit from revascularization. In this regard, findings from the ongoing COMPLETE-2 trial (ClinicalTrials.gov number, NCT05701358), a large-scale evaluation of physiology-guided revascularization as compared with angiography-guided revascularization, may help to determine the most appropriate revascularization strategy, with additional insight from intravascular imaging provided by optical coherence tomography.

Finally, it merits consideration that treatment decisions in older patients with acute myocardial infarction should not be based solely on chronologic age. Such patients differ widely with respect to cognitive status, physical ability, and severity of underlying coexisting illnesses. Goals of therapy such as quality of life and the ability to live independently may have greater value to some patients than extending life or preventing future ischemic events. A combination of shared decision making that is informed by evidence from randomized trials and individualized goals of therapy is therefore critical when managing acute myocardial infarction and multivessel coronary artery disease in this vulnerable patient population.

Disclosure forms provided by the author are available with the full text of this editorial at NEJM.org.

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